Wellard, S., Woolf, R., & Gleeson, L. (2007). Exploring the use of clinical laboratories in undergraduate nursing programs in regional Australia. International Journal of Nursing Education Scholarship, 4(1).

Nursing, as a practice-based discipline, requires a minimum level of clinical competence for registration (Heath, 2002). Undergraduate education of nurses therefore needs to incorporate clinical preparation for practice as a vital component of developing neophyte nurses. There has been considerable discussion over the past three decades about where such practical preparation should take place (Neary,1997; Su et al., 2005; Hilton & Pollard, 2004; Love et al., 1989; Bjork, 1998), but there remains little consensus or empirical evidence that identifies what pedagogical approaches can facilitate students developing nursing knowledge and transferring that knowledge to clinical practice. Pfeil (2003) argued that there is no evidence to support the often implied myth that skills-teaching was better in the past; the challenge therefore is to engage in critical investigation of how to promote excellence for learning and teaching pre-registration students practical aspects of nurse practice.

Background

Pre registration preparation of nurses has included the use of practice classrooms, or laboratories, well before the transfer of nurse education to the higher education sector (Godden & Forsyth, 2000; Scott, 2001; Neary, 1997). There are reports of on-campus facilities that are facsimiles of health care settings, most often a hospital ward, and frequently equipped with hospital beds, adult and infant mannequins and other artifacts of hospitals (Cowan & Weins, 1986; Hilton & Pollard, 2004). Simulation is a key word in the literature, where students are arguably provided with a range of simulated or ‘mock’ experiences to engage in directed and self-directed learning and practice of clinical nursing activities.

Student anxiety and employer dissatisfaction with the level of practical competence in new graduates have prompted numerous reports. Students report anxiety about feeling “clinically incompetent” (Knight & Mowforth, 1998), and perceive themselves inadequately prepared for clinical practice (Neary, 1997; Scott, 2001). Employers report a need to provide substantial support for new graduates in making the transition into the workforce (Santucci, 2004; UKCC, 1999). These issues are not isolated to nursing, but also reported in the literature relating to medical education (for example, McManus et al., 1998; Remmen et al., 1998). While there is clearly recognition of issues associated with skill acquisition there is limited research about what might constitute a solution. To

date the major emphasis in the literature has been on assessment, simulation and single case reports of innovative teaching strategies.

Working in partnership with clinical agencies, Alavi, Loh and Reilly (1991) identified three groupings of skills for student learning; fundamental skills, general therapeutic and diagnostic skills, and specialised therapeutic and diagnostic skills. They argued this structure can guide the priorities for student learning. Snyder et al. (2000) restructured the learning of psychomotor skills within the clinical laboratory with an emphasis on "communication and conceptualization of principles" that arguably allowed students to be better prepared for patient demands.

The use of role-play supports a range of student learning styles within clinical laboratory settings and has been reported as a cost effective method of learning clinical skills when compared to the costs of using technological simulation (Comer, 2005). Several authors have reported the use of videotaping to provide feedback on skills performance (Cowan & Wiens, 1986), either as student self directed activity or as teacher mediated activity. Love, et al. (1989) found no significant difference between self directed learning compared to structured clinical laboratory learning regarding psychomotor skills performance by students. Similarly, Jeffries et al. (2002) evaluated the use of self paced interactive student centred strategies finding no gains cognitively or in demonstrated skills from this approach. However, student satisfaction was higher with the interactive student-centred approach.

The frequently cited work of Gomez and Gomez (1987) compared student learning of psychomotor skills within laboratory and patient care settings. They argued that student learning should be within a range of conditions that are experienced rather than simply focus on stable and unchanging conditions. They found that students who practiced in the patient care setting had higher scores in accuracy and confidence.

Methods for assessing skill development have increasingly been emphasised (Redfern et al., 2002), particularly since the wide adoption of problem based learning (PBL) curricula in health professional education. Objective structured clinical examinations (OSCEs) have become a dominant method for assessing competency of clinical skills (Koop & Borbasi, 1994) and have been argued as important as a formative method to increase skills and competencies through reflective learning practices (Alinier, 2003; Nicol & Freeth, 1998).

There is growing interest in the use of simulation techniques to support clinical learning, particularly in medical education (Maran & Galvin, 2003; Bradley & Postlewaite, 2003).There is limited evaluation of the use of technologically supported simulation in nursing education. Some researchers have reported simulation training was beneficial (Peteani, 2004; Alinier, 2006). However, Alinier (2006) found that confidence and level of performance was not correlated with simulation training and importantly that students reporting stress when working in a technological environment also reported a lack of confidence.

There is an inherent assumption in the literature that clinical laboratories are necessary, but there has been limited discussion of what constitutes the necessary infrastructure for undergraduate clinical laboratories. Interestingly Scott (2001) presented a range of criteria for practical success of clinical learning laboratories in the UK but offered only anecdotal experience for these recommendations. Childs (2002) was the only study we could locate that had investigated the physical structure, resources, budget and administration of clinical laboratories in a national survey of nursing schools in the USA. Childs found that these facilities, which she termed Clinical Resource Centers (CRC), provided opportunities for student self-directed learning activities and faculty-directed learning experiences. Self-directed learning activities were supported by audiovisual facilities, computer use as well as group study. Barriers identified in the use of the CRC included space, lack of staff, lack of appropriate equipment and technology. Additionally, a mismatch of curriculum and resources was also identified as a barrier to successful utilisation of CRC's.

Given the paucity of knowledge about what pedagogical approaches can facilitate students learning in clinical laboratories we undertook to identify how clinical laboratories were used in undergraduate programs in regional and rural environments in one state in Australia. This was planned as a first step in a broader program of work to identify pedagogies that promote teaching and learning for clinical practice.

Methodology

This exploratory study used an interpretive qualitative design (Thorne et al., 1997) to investigate how clinical learning laboratories are currently being constructed in undergraduate Bachelor of Nursing courses in regional Victoria. Semi-structured interviews, review of curriculum documentation and developing an inventory of resources used in laboratory learning were methods employed to collect data.

The Head of School of Nursing responsible for each of the eight university campuses in regional Victoria that offer Bachelor of Nursing programs were invited and agreed to their staff's participation in the study. Contact was then made with staff that had specific roles in the planning, delivery and/or evaluation of clinical learning laboratories in their program.

Site visits to each campus were conducted by two of the investigators (SW, RW) to collect data and included a tour of the facilities and interviews with interested academic and laboratory support staff. The topics for discussion included institutional demographic data including number of students enrolled in the program; the range and foci of laboratory sessions used to support the theoretical component of the course; identification of the strengths of the particular program and perceived barriers to the development of an optimal clinical laboratory program. Ten interviews were conducted and audio-taped with permission of the participants and later transcribed verbatim to facilitate analysis. Transcripts of tapes were initially produced by a professional transcriber and verified by two members of the team (SW, RW). Curriculum documents and resources related to the clinical laboratory learning were reviewed prior to the interviews to provide background about the program.

Thematic data analysis was undertaken to identify the major aspects of the conduct of the clinical laboratory learning programs. Analysis began during the data collection when interviews were converted to text by verbatim transcription (Wellard & McKenna, 2001). Thematic analysis involved a search for patterns and regularities in the data as well as contradictions and tensions between the various views of the participants and recorded observations (Kvale, 1996). Each team member individually identifyed their own schema of themes through reading and rereading the transcribed data. Subsequently, findings were shared and similarities and differences in analyses noted. Areas of disagreement required a re-examination of the data as a team and further discussion until agreement on analysis was reached.

Findings

All participants related a belief that clinical laboratories were a vital part of their Bachelor of Nursing (BN) program and an important first stage for students to rehearse skills before entering the 'real' world of practice. The laboratory is one of several teaching strategies used in teaching nursing subjects across all six semesters of the BN. The findings are presented as three major themes: physical and staffing resources; what happens in labs?; and constraints and challenges.

Physical and staffing resources

All eight sites had purpose specific space dedicated for clinical laboratory learning and each to some extent represented contemporary hospital environments. Most spaces were set up in a similar way, hospitals beds with mannequins in various arrangements and with a range of equipment surrounding them (IV pumps, wheelchairs, etc.). Two sites had established additional smaller rooms where students could have individual instruction or self directed learning. One site had designed an adjacent classroom space with chairs and whiteboard where preliminary instruction could take place, prior to demonstration and practice of skills taking place in the laboratory proper. The other laboratories had chairs in the lab which were stacked at the side when not in use. The laboratory spaces were limited in part by their older style architecture which was initially designed for classroom teaching. Most of the facilities had difficulties with storage space for the array of equipment they held. The one exception had recently renovated their laboratory spaces which allowed storage in each of the laboratories that resembled the contemporary set up of hospital ward storage areas.

All sites had someone who was responsible for the day to day management of the laboratory spaces, usually referred to as laboratory technicians, and in all cases only employed in this role on a part time basis. While not a formal requirement for employment, all but two of these technicians had a background in nursing, with five registered nurses and one enrolled nurse. In two organisations an academic member of staff had responsibility for laboratory coordination and worked with the technicians to ensure the smooth running of the laboratories. In the remaining sites, technical staff liaised with various members of staff to meet their various requirements. The limited time of technicians reportedly influenced the amount of self-directed learning outside class time that was available for students. Four sites offered unsupervised access to laboratories and one offered supervised access only.

What happens in labs?

There was consistency in the description of how laboratories were used across all sites. Participants all emphasised their commitment to a ‘principles’ compared with ‘skills’ based approach to teaching in laboratories. They expected that a principles approach would support an increased confidence and skill level in students. In both observation and interview data there was evidence of the predominance of teacher talk and demonstration in the formally timetabled laboratory classes. Teaching staff were observed giving mini lectures and using a range of resources to explain, and subsequently demonstrate the specific skill being taught. Students were then provided with an opportunity in small groups

(2-6 students) to practice the skill. These formal classes were in most cases of two hours duration, and reportedly, students usually had at least one opportunity to handle and manipulate the specific equipment and enact the skill during this time. Staff emphasised the laboratory was a place for building student confidence.

Most schools had difficulty in staffing the teaching of laboratories, and employed nurses with recency of practice to teach a large percentage of these classes on a sessional basis. This was argued as providing students with instruction that had a better fit with the 'real' world of practice, but often these sessional staff had little preparation or experience as educators. Additionally, as these staff were only employed to teach specific sessions they were not available out of class to assist students

The focus of laboratories sessions in most cases had limited synchronicity with the academic classes due largely to the complexity of timetabling. Only one site reported achieving clear progression from lecture, to tutorial and then laboratory relating theory to the practice required. The assessment of learning related to the laboratories differed across the seven sites but was argued by all as important. Most programs undertook to assess the level of skills competency during each semester; for some this was a prerequisite to entry to workplace learning, for others it formed part of the assessment for the semester without a direct link to practicum experience. The use of various forms of OSCE was common with students assessed individually or in pairs by a staff member. One School reported previously using student generated video recordings for assessment but had found it used too much staff time to be practical.

Constraints and challenges

Participants found it difficult to articulate a pedagogical approach that supported their clinical laboratory program. They described teaching strategies, and in a limited number of cases discussed what they considered as teaching innovations. These included the introduction of student purchased equipment packs, use of stainless steel equipment in preference to recycling single use items in the laboratory and a plastering laboratory where students apply plaster of paris to mock fractures. While believing the lab learning was a vital part of their programs there had been little evaluation of the laboratory program as an overall strategy in their course. Students were invited to comment on the laboratories as part of their overall program, but not specifically asked to reflect on how laboratories assist or otherwise influence their specific learning of clinical skills.

There was a clear emphasis within all the laboratory programs on acute care nursing skill development. Units of study over the six semesters of Bachelor of Nursing programs are discrete and not directly linked. It is possible to for students to have components repeated but there is difficulty in supporting learning that integrates content from multiple units of study. Only one School reported the use of labs for skills related to mental health nursing.

All sites reported an increasing constraint presented by Occupational Health and Safety laws, privacy legislation and the interpretation of these in their institutions. There are barriers now to taking blood samples, including self administered blood glucose testing, the use of facsimile medications and oxygen are also seen as problematic. Physical examination of other students is also rarely undertaken due to concerns about privacy and potential for misinterpreting previously undetected signs of disease (for example, reading ECGs).

All participants recognised a potential role for the use of simulation and technology within the clinical laboratory programs. However, there was hesitancy about its probable introduction due to the limited resources allocated to laboratory learning. All sites reported some difficulties in the level of current equipment they had available to support student learning. More than half of the sites reported having out-dated equipment. Two sites share the clinical laboratory facilities with other programs. Four sites had established relationships with local hospitals or agencies that facilitated the sharing and/or borrowing of equipment. Many participants reported local health care agencies donating out of date stock to help supplement the laboratories.

Discussion

Clinical learning laboratories in this study were founded on tradition. There was considerable similarity to the laboratory or practice classrooms that two of the authors were exposed to in their pre-registration preparation in hospitals in the 1970s and 1980s, as also reflected in historical accounts of hospital based training (Godden & Forsyth, 2000). The model used in each setting was passed on by the previous staff and any modification was constrained by limited economic and physical resources as well as by legal caution. The economic and physical limitations on clinical laboratories have been noted in other countries (Bradley & Postlethwaite, 2003: Childs, 2002). The caution related to OHS and privacy legislation had not previously been published in the context of clinical laboratories. If this OHS constraint continues to grow, the viability of clinical

learning laboratories as any form of simulation of health care settings will be at risk.

There was little evidence of conscious educational theories underpinning the teaching practices adopted within the sample. Innovation was limited and perhaps there is a need to create more opportunities for staff development in curriculum and teaching design in non traditional settings – the innovations found in the literature that focused on team work (Mole et al., 2003) and interpersonal communication through role play (Comer, 2005) for example could be adopted.

The findings indicate that the clinical laboratory learning facilities in this study are actively reproducing the hospital as the site of clinical practice and all the values that environment inscribes. The focus of the labs on psychomotor skills development reinforces these values where cure and high technology are valued and promoted over other aspects of practice. The less emphasised areas of communication and interpersonal skill development in a practice context are in turn devalued.

This study limited its investigation to the physical inspection, and reported practices of a number of clinical skills laboratories in one Australian state. Our findings then can only be interpreted within that context but they do raise a number of serious questions and provide direction for further work to explore the relationships between pedagogical approaches and the role of clinical learning laboratories within the integrated curriculum framework. Schools of Nursing need to engage in meaningful evaluation of the laboratory programs they currently use, examining the teaching strategies, student outcomes and return on investment.

Conclusion

There is a minimal research to support the current use of laboratories in undergraduate nursing programs, and this study indicates tradition rather than empirical evidence leads the current practices in skill development. There was limited direct integration found between the theoretical and practical aspects of the BN program. Teacher talk is more dominant than student hands on practice of skills which is increasingly limited by legislative obstacles related to privacy and occupational safety. The absence of a theoretical basis for teaching in laboratories is of concern; we contend that laboratories, like any learning situation, require a theoretically informed pedagogical approach.

There is an urgent need for more investigation of laboratories as a site for developing skills for practice. Programs of research should investigate current teaching practices in laboratories; engage both teachers and learners in understanding pedagogies that support and/or hinder learning; consider the cost and learning return on investing in various technologies; and analyse the impact of occupational health and safety requirements on creating meaningful laboratory experiences. Academics engaged in the teaching of undergraduate students need to examine their practices to ensure there is a theoretical congruence in their approach to teaching in both the laboratory and other classroom settings.

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